REMARKS

Applicants have thoroughly considered the Examiner's remarks in the January 4, 2007 Office action and respectfully request reconsideration in light of the following. Claims 1-34, 37, and 38 are pending in the present application.

Applicants respectfully acknowledge the notification of allowable subject matter in claims 4-9, 13-16, and 26-33. Applicants elect to keep these claims in dependent form pending the Office's response to these remarks.

As a preliminary matter, Applicants again request that the Examiner provide an indication that the drawings filed February 17, 2004 are acceptable.

Claim Rejections under 35 U.S.C. § 102(b)

Claims 37 and 38 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,872,622 (Schildmeyer et al.). Applicants disagree with the rejection and respectfully request reconsideration.

Claim 37

Claim 37 is directed to a light scattering detector device, comprising:

> a detection cell to accept particles suspended in a gas stream and permit a light beam to pass through a trajectory of the particles and gas stream;
>
> a sample light detector disposed to detect light scattered in the detection cell;
>
> a light trap that accepts the light beam after it passes through the detection cell;
>
> a heated inlet port that extends into said detection cell to control the trajectory of the particles and gas stream; and
>
> a heated exit port that extends into said detection cell to control the trajectory of the particles and gas stream; **wherein said heated inlet port and said heated exit port are thermally conductive and said detection cell is thermally nonconductive**.

(emphasis added). None of the references of record disclose such a light scattering detector device. To anticipate a claim, each and every element set forth in the claim must

be found in a single prior art reference. M.P.E.P. § 2131. But the Schildmeyer reference fails to teach each and every element of this claim.

While the Office maintains its previous rejection of claim 37 as anticipated by Schildmeyer et al, the cited art neither teaches nor suggests Applicants' light scattering device having a heated inlet port and a heated exit port that are **thermally conductive** and having a detection cell that is **thermally nonconductive**.

In the present action, the Office directs Applicants to the following portion of the Schildmeyer reference as teaching a detection cell that is thermally nonconductive:

> In FIGS. **8** and **9**, optics block **68** is seen to have a central view volume **56**. The view volume has a central clear zone **77** between the inlet tip **79** of inlet nozzle **72** and the outlet tip **81** of outlet nozzle **76**. The clear zone **77** allows a light beam to pass through the optics block without obstruction using an inlet light channel **83** to communicate with an outlet light channel **85**. Actually, there are two outlet light channels, one for a beam stop and another, at an angle to the beam, for sampling light scattered by particles. Not all scattered light is captured, only light at a selected angle, such as 90 degrees to the beam or perhaps a smaller angle.
>
> The primary stream of gas **94** is held as if it were in a conduit by the purge gas in the secondary stream **96**. The purge gas emerges from the purge gas inlet **74**. The flow of purge gas into the view volume is widened by a purge baffle **75**, causing the gas to then converge from the baffle toward the center of the view volume, namely to the clear zone **77** where the converging purge gas tends to coaxially pinch or constrain the primary stream of fluent material before entering the tip **81** of the outlet nozzle.
>
> It will be noted that heaters **90** and **92** are mounted in collars **91** and **93**, each collar having a portion surrounding a respective inlet nozzle **72** and an outlet nozzle **76**. The inlet heater **90** and the outlet heater **92** are maintained at a temperature of 85°–90° C. to prevent condensation of vapor on the flow surfaces of the optics block.

Schildmeyer et al., col. 7, lines 15-41; see part 68 of Fig. 8.

The Office incorrectly equates the central view volume 56 taught by Schildmeyer et al. to Applicants' detection cell and contends that it is thermally nonconductive by optics block 68. As previously discussed, Schildmeyer et al. call out no detection cell *per se*, but the optics block 68 depicted in Figs. 6, 8, and 9 is clearly where the light beam

and primary stream of gas 94 interact. As such, Schildmeyer et al. must teach that the optics block 68 is thermally nonconductive to anticipate claim 37. But nothing in the cited teaching of Schildmeyer et al. discloses that optics block 68 is thermally nonconductive.

In response to Applicants' remarks, the Office asserts that the "ports" 90 and 92, which are actually heaters 90 and 92, are thermally isolated from central view volume 56 by the collars 91 and 93 and the optics block 68. Applicants respectfully submit that the Office has again missed the point. It is the detection cell itself, or optics block 68, that must be thermally nonconductive. When read as a whole, the Schildmeyer reference clearly demonstrates that optics block 68 is thermally conductive rather than nonconductive, and therefore the thermal isolation of central view volume 56 from the heaters 90, 92 is immaterial. What is dispositive is the thermal conductivity of the optics block 68.

In fact, Schildmeyer et al. teach away from the invention set forth in claim 37. For example, Schildmeyer et al. note that an "object of the invention was to devise a condensation nucleus counter having **improved vapor flow, especially in the viewing volume**, exhaust filtration and working fluid recovery." Schildmeyer et al., column 2, lines 52-55 (emphasis added). As discussed in the Summary of the Invention, this object is at least partially achieved by "**[h]eating of the [optics] block defining the view volume** [thereby] prevent[ing] condensation of vapor on the block." Schildmeyer et al., column 3, lines 4-7. Schildmeyer et al. also state that "**[t]he optics block is preferably heated** to prevent condensate on the particles from condensing on the optics block." Schildmeyer et al., column 6, line 66 to column 7, line 1. Based on the foregoing, the Schildmeyer reference clearly states that heating of the optics block can prevent condensation of vapor on the block. A block subject to such intentional heating for condensation prevention must necessarily be formed from a thermally conductive material. Moreover, the drawings illustrate that optics block 68 is made of metal. Thus, Schildmeyer et al. teach a thermally **conductive** optics block, which is in direct opposition to the claimed thermally **nonconductive** detection cell.

In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the rejection of claim 37.

If the Office maintains the rejection of the present claim, Applicants request the courtesy of a phone call to the undersigned at (314) 231-5400.

Claim 38

Claim 38 is directed to a light scattering detector device, comprising:

a detection cell to accept particles suspended in a gas stream and permit a light beam to pass through a trajectory of the particles and gas stream;

a sample light detector disposed to detect light scattered in the detection cell;

a light trap that accepts the light beam after it passes through the detection cell;

a heated inlet port **that extends into said detection cell to control the trajectory of the particles and gas stream**; and

a heated exit port **that extends into said detection cell to control the trajectory of the particles and gas stream; wherein said heated inlet port and said heated exit port are thermally isolated from said detection cell**.

(emphasis added). None of the references of record disclose such a light scattering detector device. Because Schildmeyer et al. fail to teach each and every element of this claim, the rejection must be withdrawn.

In contrast to the cited art, claim 38 requires a heated inlet port and a heated exit port thermally isolated from the detection cell. Moreover, this claim specifies that the ports extend into the detection cell to control the trajectory of the particles and gas stream. Applicants respectfully submit that the cited art fails to disclose the thermally isolated ports as set forth in claim 38.

In this instance, the heaters 90 and 92 taught by Schildmeyer et al. do not constitute a heated inlet **port** and a heated exit **port** as claimed by Applicants because they do not **extend into the detection cell to control the trajectory of the particles and gas stream**. See Schildmeyer et al., Fig. 8. Likewise, heating systems 36 and 40 do not **extend into the detection cell to control the trajectory of the particles and gas stream** and, thus, cannot anticipate the claimed heated inlet and exit ports. See Schildmeyer et al., Fig. 1.

In addition, claim 38 specifies that one of the ports is an **inlet** and the other is an **exit**. Schildmeyer et al., in contrast to the claimed invention, teach that both the first

heating system 36 and the second heating system 40 are upstream of the volume 56 of the optics block 68. See Schildmeyer et al., Fig. 1. To even arguably anticipate the **heated inlet port** and the **heated exit port** of claim 38, one of the heating systems 36,40 must be upstream of the volume 56 of the optics block 68, while the other of the heating systems 36,40 must be downstream of the volume 56 of the optics block 68. Without such an arrangement, the heating systems cannot anticipate both a heated inlet port and a heated exit port as required by claim 38. Because both the first heating system 36 and the second heating system 40 are upstream of the volume 56 of the optics block 68, there can be no anticipation.

In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the rejection of claim 38.

If the Office maintains the rejection of the present claim, Applicants request the courtesy of a phone call to the undersigned at (314) 231-5400.

Claim Rejections under 35 U.S.C. § 103(a)

Claims 1, 2, 10-12, 23, and 24 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,903,818 (Cerni et al.) in view of DE 38 41 979 A1 (Ostwald). In addition, dependent claim 3 stands rejected as obvious in view of these references in combination with U.S. Patent No. 4,725,140 (Musha); dependent claims 17-20 stand rejected as obvious in view of these references in combination with Schildmeyer et al.; and dependent claims 21 and 22 stand rejected as obvious in view of these references in combination with U.S. Patent No. 6,490,530 (Wyatt). Applicants respectfully disagree and request reconsideration.

Claim 1

Claim 1 is directed to a light scattering detector device, comprising:

a detection cell to accept particles suspended in a gas stream and permit a polarized beam to pass through a trajectory of the particles and gas stream;

a sample light detector disposed to detect light scattered in the detection cell; and

> **a light trap that accepts the polarized beam after it passes through the detection cell, the light trap including,**
>
> **an elongated housing through which the polarized beam passes, and light absorptive material within the elongated housing**; and
>
> an absorptive filter disposed to substantially align the electric field vector of the polarized beam with the plane of incidence defined by the polarized beam and the normal to said absorptive filter, and disposed to intersect the polarized beam at an angle of incidence that approximates Brewster's angle.

(emphasis added). To establish a prima facie case of obviousness, the Office must (1) provide some suggestion or motivation in the cited reference, or in the knowledge generally available to one skilled in the art, to modify the reference, (2) demonstrate a reasonable expectation of success in the modification, and (3) demonstrate that the prior art reference teach or suggest all of the claim limitations. M.P.E.P. § 2143.

Claim 1 is directed to a light scattering detector device comprising a light trap that accepts the polarized beam after it passes through the detection cell. The light trap includes an elongated housing through which the polarized beam passes, and light absorptive material within the elongated housing. Applicants previously argued that the Office failed to establish a prima facie case of obviousness. Applicants reassert those arguments here and also submit clarifying arguments discussed below.

First, the Office did not counter Applicants' argument that the cited art does not demonstrate a reasonable expectation of success in combining Cerni et al. and Ostwald by modifying the intracavity laser particle counter of Cerni et al. with the light trap of Ostwald. And the Office failed to address Applicants' argument that these devices teach away from one another, as one is an intracavity device while the other is applicable only to extracavity devices. In particular, the light trap of claim 1, or that defined by Ostwald, cannot be used with Cerni et al. because (i) the light trap would kill the laser and (ii) the light inside the Cerni cavity is not polarized.

Generally speaking, lasers include a laser cavity bound by two opposing mirrors. The laser cavity contains a lasing medium that emits photons during excitation. The opposing mirrors on opposite sides of the lasing medium reflect photons back and forth through the lasing medium, further enhancing stimulated emission. Some lasers have one mirror adapted for partial transmission and partial reflection, which allows some of the

photons to leave the cavity as conventional, extracavity laser light. Light within the cavity can be referred to as intracavity laser light.

Returning to the teaching away of the present case, Cerni et al. and Ostwald operate in fundamentally different ways with fundamentally different laser arrangements. Their combination would result in a failure of the Cerni et al. device to function properly. In particular, the apparatus of Ostwald is adapted to trap light of any kind. When combined with extracavity laser light, for example, the apparatus traps the extracavity light. But because the laser source does not allow all of its photons to leave the laser cavity due to its partially transmission/reflection mirror, the laser can continue to function with the intracavity laser light. In contrast, the device of Cerni et al. relies upon an intracavity detecting region 408. This region is inside the laser cavity itself. Thus there is no need for a light trap, as all of the laser light can be retained within the laser cavity for further excitation of the lasing medium. As Applicants stated in the previous response, the addition of a light trap as disclosed in Ostwald to the apparatus of Cerni et al. would stop the Cerni et al. laser from functioning. By placing such a light trap within the laser cavity, no photons would reach the second mirror and the lasing medium would no longer receive any reflected photons. Without these reflected photons from the second mirror 405, the laser could no longer function properly. In fact, the laser would never begin functioning at all because of the lack of photons. For this reason, the light trap of Ostwald and the particle counter of Cerni et al. cannot be combined. They each teach away from one another, as one is an intracavity device while the other is applicable only to extracavity devices.

Furthermore, intracavity and extracavity designs function in such a different manner that one skilled in the art would not look to one for features applicable to the other. For example, because all of the laser light is retained within the laser cavity, intracavity lasers typically have intensities greater than about twenty to forty times extracavity lasers of similar power. Thus intracavity devices typically have higher sensitivities, making their teachings generally inapplicable to extracavity devices. Conversely, extracavity devices have the advantage of being able to use other types of light sources, which make their teachings generally inapplicable to intracavity devices, which function only with lasers.

Because the Office has failed to demonstrate a reasonable expectation of success in combining Cerni et al. and Ostwald by modifying the intracavity laser particle counter of Cerni et al. with the light trap of Ostwald, the present prima facie case of obviousness fails. As discussed in great detail immediately above, this combination will fail to work because the intracavity light trap will not allow the laser of Cerni et al. to function. Thus, the Office can never demonstrate the present case of obviousness with the cited references because there is no chance that such a modification will succeed.

In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the rejection of claim 1. Claims 2-24, which depend directly or indirectly from claim 1, are also submitted as patentable for the same reasons as set forth above with respect to claim 1.

If the Office maintains the rejection of the present claim, Applicants request the courtesy of a phone call to the undersigned at (314) 231-5400.

Applicants further request reconsideration of the rejection of claim 25 under 35 U.S.C. § 103(a) as being unpatentable over Prior Art of Present Invention (Fig. 1) in view of U.S. Patent No. 5,061,065 (Sommer) and reconsideration of the rejection of claim 34 further in view of Schildmeyer et al.

Claim 25

Claim 25 is directed to a light scattering detector device, comprising:

> a detection cell to accept particles suspended in a gas stream and permit a light beam to pass through a trajectory of the particles and gas stream;
>
> a sample light detector disposed to detect light scattered in the detection cell;
>
> a light trap that accepts the light beam after it passes through the detection cell;
>
> a sample compound lens collector to direct light scattered in the detection cell upon the sample light detector; and
>
> **a spherical mirror to direct light scattered in the detection cell to the compound lens collector**.

(emphasis added). The cited references cannot establish a prima facie case of obviousness because they fail to teach or suggest all of the claim limitations.

In the Sommer reference:

> plasma tube. A spherical mirror **39** is provided on the opposite side of the window pane **35** to reflect the laser beam back to the plasma tube **37** and define an external section for the laser of the plasma tube **37** between the mirror **39** and the window pane **33**. The outside and inside walls of each of the windows **33** and **35** define an interface through which the laser beam passes and each of these outside and inside walls must be arranged at the brewster angle with respect to the laser beam. Because the gas entraining the particles flowing in the channel **31** will have essentially the same index of refraction as the gas in the plasma tube **37** as well as the air between the window **37** and mirror **39**, essentially an index of refraction of **1**, the outside and inside walls of the windows **33** and **35** will all be parallel and the window panes **33** and **35** may be flat panes of glass.

Sommer, column 5, lines 7-22.

In contrast to the cited art, the light scattering detector device of Applicants' claim 25 includes a spherical mirror to direct light **scattered in the detection cell to the compound lens collector**, which, in turn, improves sensitivity of the detector device. The Sommer reference merely teaches a spherical mirror for use in beam transmission, i.e., in the plasma tube, to define an external section of the laser. Thus, Sommer does not show directing light, scattered in the detection cell by the sample, to the compound lens collector. The cited art, whether considered separately or in combination, fails to teach each and every limitation of claim 25.

Applicants respectfully request that the Office withdraw the rejection of claim 25. Claims 26-34, which depend directly or indirectly from claim 25, are also submitted as patentable for the same reasons as set forth above with respect to claim 25.

Conclusion

Applicants submit that claims 1-3, 10-12, 17-25, 34, 37, and 38, in addition to claims 4-9, 13-16, and 26-33 previously indicated as having allowable subject matter, are in condition for allowance. Therefore, favorable reconsideration and allowance of this application is requested.

The Commissioner is hereby authorized to charge any underpayment and credit any overpayment of government fees to Deposit Account No. 19-1345.

Respectfully submitted,

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